

## Views of Local Agencies

This project is strongly supported by the U.S. Fish and Wildlife Service as a part of its South Florida Coastal Ecosystem Program. This program is used to protect, conserve, and restore coastal living resources through the implementation of "on ground" restoration projects as well as to perform research, monitoring, and public outreach activities. The Lake Worth Lagoon Management Plan also supports this project.

## DIVISION OF PLAN RESPONSIBILITIES

Cost Allocation. Section 1135(a) of the 1996 Water Resources Development Act specifies that the cost of modification to constructed Federal water resource projects for the purposes of environmental restoration is 75 percent Federal and 25 percent non-Federal. Additional guidance on Section 1135 cost sharing is provided in Engineering Pamphlet 1165-2-1 dated 15 February 1996. Table 5 details the cost sharing of the Ecosystem Restoration Report.

**TABLE 5**

<b>TOTAL PROJECT COST</b>	
** Costs include a 20% contingency	
<b>ITEM</b>	<b>COST</b>
<b>STUDY COST</b>	
Ecosystem Restoration Report	\$ 92,000
<b>IN-KIND SERVICES</b>	
Technical Plans and Specifications	\$ 45,000
Red Mangrove Plants	\$ 41,150
Permit(s)	\$ 25,000
<b>IMPLEMENTATION COSTS</b>	
Non-Construction Costs	
Preconstruction, Engineering and Design *	\$ 107,600
Construction Management	\$ 52,460
Real Estate Administrative Cost	\$ 12,000
Construction Costs **	\$ 408,470
<b>TOTAL PROJECT COST</b>	<b>\$ 783,680</b>
<b>TOTAL Federal Cost Share @ 75%</b>	<b>\$ 587,760</b>
<b>Non-Federal Cost Share @ 25%</b>	<b>\$ 195,920</b>
Minus Credit for In-Kind Services	\$ 111,150
<b>TOTAL Non-Federal Cost Share (cash contribution)</b>	<b>\$ 84,770</b>

\* PED cost excludes \$45,000 for Technical P&S and \$25,000 for permits, which is listed as an in-kind service contribution.

\*\* Cost excludes \$41,150 for red mangroves, which is listed as an in-kind service contribution.

## Federal Responsibilities

The U.S. Army Corps of Engineers is responsible for budgeting for the Federal share of construction costs for this project. The Federal share of construction costs is estimated at \$587,760 or 75 percent of the total implementation costs. Federal funding is subject to budgetary constraints inherent in the formulation of a national Civil Works budget for a

given Fiscal Year. The Corps would perform the necessary pre-construction, engineering, and design needed prior to construction. The Corps will also obtain the water quality certification, advertise, award, and construct this restoration project.

### **In-Kind Services**

The non-Federal sponsor will provide the technical plans and specifications, red mangrove plants for restoration, and obtain the necessary permits for construction.

### **Non-Federal Responsibilities**

The non-Federal sponsor shall provide 25 percent of the implementation costs allocated to the modification of John's Island for purposes of environmental restoration. The non-Federal share of the construction is estimated to be \$195,920 or 25 percent of the total implementation costs. The non-Federal sponsor must also assume other responsibilities before the project can be constructed. These "items of cooperation" are listed in the Recommendations section of this report. The delineation of the Federal and non-Federal responsibilities are legally defined in the PCA. The non-Federal sponsor will:

- a. Pay 100 percent of any operation, maintenance, repair, replacement, and rehabilitation cost attributable to the Environmental Restoration.
- b. Provide all additional lands, easements, and rights-of-way; borrow dredged and dredged material disposal areas; perform all relocations determined by the Federal Government to be necessary for the Environmental Restoration beyond those lands already acquired for the existing project; and provide evidence to support the Local Sponsor's legal authority to grant rights-of-entry to such lands. The necessary lands, easements, and rights-of-way determined by the Federal Government to be necessary for work to be performed under construction contract must be furnished prior to the advertisement of the construction contract.
- c. Provide or pay to the Federal Government the cost of providing all retaining dikes, wasteweirs, bulkhead, and embankments, including all monitoring features and stilling basins, that may be required at any dredged material disposal area necessary for the Environmental Restoration.
- d. Comply with applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-66, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-7); the Uniform Regulations contained in 9 CFR Part 2, in acquiring lands, easement, and rights-of-way for construction and subsequent operation and maintenance of the Environmental Restoration; and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.
- e. Provide, during implementation, cash payments to meet its obligations under Article II of the Project Cooperation Agreement (PCA). Study cost and Plans and Specification costs will be funded up front by the Federal Government. Total Environmental Restoration costs will be reapportioned during the implementation period to meet the cost-sharing requirements.

## **SUMMARY OF COORDINATION, PUBLIC VIEWS, AND COMMENTS**

The draft Environmental Assessment was distributed to the appropriate Federal, State and local agencies and is included in this report. There were no substantive comments received.

The draft Environmental Assessment contains letters and other pertinent correspondence received as a result of coordinating this project. The Ecosystem Restoration Report and EA were circulated to all governmental agencies for a 30-day review period beginning mid-November 2000.

## **CONCLUSIONS**

This report summarizes the feasibility of modifying John's Island under the authority of Section 1135 of the Water Resources Development Act of 1986 for the purposes of providing environmental benefits in the public interest. The most practical and economical means to restore the ecosystem is based on the recommended plan in this feasibility study. The recommended plan herein provides a means of achieving ecosystem restoration by reestablishing habitat for fisheries and wildlife; removing exotic vegetation; and planting native plants for the environment. The proposed modification to John's Island is economically justified and in accordance with current Department of the Army budgetary policy.

## **RECOMMENDATIONS**

I have given consideration to all significant aspects of the proposed ecosystem restoration of John's Island in Palm Beach County, Florida, in the overall public interest, including engineering and economic feasibility, environmental and social effects. The recommended plan described in this report provides for the optimum solution for ecosystem restoration of the study area that can be developed within the framework of the formulation concept.

I recommend that John's Island, which is a part of the Intracoastal Waterway project be modified under the general authority of Section 1135 of the Water Resources Development Act of 1986 for the purpose of ecosystem restoration. The non-Federal Sponsor shall enter into a binding agreement with the Secretary of the Army or his designated representative to perform the following items highlighted in the project cooperation agreement:

- a. Provide all lands, easements, and rights-of-way, and suitable borrow and dredged or excavated material disposal areas, and perform or ensure the performance of all relocations determined by the Federal Government to be necessary for the implementation, operation, and maintenance of the Project Modification;
- b. Provide all improvements required on lands, easements, and rights-of-way to enable the proper disposal of dredged or excavated material associated with the implementation, operation, and maintenance of the Project Modification. Such improvements may include, but are not limited to, retaining dikes, water weirs, bulkheads, embankments, monitoring features, stilling basins, and dewatering pumps and pipes;

- c. Provide, during implementation, any additional amounts as are necessary to make its total contribution equal to 25 percent of the project environmental restoration costs and 50 percent of the project recreation costs;
- d. For so long as the Project Modification remains authorized, operate, maintain, repair, replace, and rehabilitate the completed Project Modification, or functional portion of the Project Modification, at no cost to the Federal Government, in manner compatible with the Project Modification, or functional portion of the Project Modification's authorized purposes and in accordance with applicable Federal and State Laws and regulations and any specific directions prescribed by the Federal Government;
- e. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor, now or hereafter, owns or controls for access to the Project Modification for the purpose of inspection, and, if necessary, after failure to perform by the non-Federal sponsor for the purpose of completing, operating, maintaining, replacing, or rehabilitating the Project Modification. No completion, operation, maintenance, repair, replacement, or rehabilitation by the Federal Government shall operate to relieve the non-Federal sponsor of responsibility to meet the non-Federal Sponsor's obligations, or to preclude the Federal Government from pursuing any other remedy at law or equity to ensure faithful performance;
- f. Hold and save the United States free from all damages arising from the implementation, operation, maintenance repair, replacement, and rehabilitation of the Project Modification and any Project Modification related betterment, except for damages due to the fault or negligence of the United States or its contractors;
- g. Keep, and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the Project Modification in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 Code of Federal Regulations (CFR) Section 33.20;
- h. Perform, or cause to be performed, any investigations for hazardous substances as are deemed necessary to identify the existence an extent of hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the implementation, operation, and maintenance of the Project Modification, except for any such lands, easements, or rights-of-way that are owned by the United States and administered by the Federal Government and except for any such lands that the Federal Government determines to be subject to the navigational servitude. The Government shall perform, or cause to be performed, al investigations on lands, easements, or rights-of-way that are owned by the United States and administered by the Federal Government. For lands that the Federal Government determines to be subject to navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the non-Federal sponsor with prior specific written direction, in which case the non-Federal sponsor shall perform such investigations in accordance with such written direction;

- i. Assume complete financial responsibility, as between the Federal Government and the non-Federal sponsor, for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the implementation, operation, or maintenance of the Project Modification, except for such lands, easements, or right-of-way owned by the United States and administered by the Federal Government.
- j. As between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be considered the operator of the Project Modification for the purpose of CERCLA liability. To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the Project Modification in a manner that will not cause liability to arise under CERCLA:
- k. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, required for the implementation, operation, and maintenance of the Project Modification, including those necessary for relocation, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;
- l. Comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C.2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army";
- m. Provide 25 percent of that portion of total historic preservation mitigation and data recovery costs attributable to the Project Modification that are in excess of one percent of the total amount authorized to be appropriated for the Project Modification;
- n. Under no circumstances shall the total Federal cost of the environmental restoration, including previous study costs, exceed the legislated maximum per modification total cost of 5,000,000;
- o. Not more than 80 percent of the non-Federal sponsor share of the total project cost may be credited for work-in-kind.

The recommendations contained herein reflect the information at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are authorized under the general provisions of Section 1135 of the Water Resources Development Act of 1986, as amended and considered for implementation funding.

*for C.P. Boruch LTC EN  
Dep Col*  
JAMES G. MAY  
Colonel, U. S. Army  
District Engineer

Christopher P. Boruch  
Lieutenant Colonel, U.S. Army  
Acting District Engineer

## REFERENCES

Dames & Moore. 1990. Lake Worth Lagoon Natural Resources Inventory and Resource Enhancement Study.

Surface Water Improvement and Management Plan (SWIM), Draft 1997. Palm Beach County Department of Environmental Resources Management.

## LIST OF PREPARERS

The U.S. Army Corps of Engineers (USACOE) had the primary responsibility of preparing this document. The U.S. Fish and Wildlife Coordination Act Report was prepared by U.S. Fish and Wildlife Service, which was used in preparing the draft Ecosystem Restoration Report and Environmental Assessment. Palm Beach County Department of Environmental Resources provided input on the existing resources.

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SECTION 1135  
ECOSYSTEM RESTORATION REPORT

APPENDIX A

ENGINEERING APPENDIX

FOR

JOHN'S ISLAND  
PALM BEACH COUNTY, FLORIDA

U. S. ARMY CORPS OF ENGINEERS  
JACKSONVILLE DISTRICT

**JOHNS ISLAND – SECTION 1135  
ENVIRONMENTAL RESTORATION  
PALM BEACH COUNTY, FLORIDA**

**APPENDIX A  
ENGINEERING**

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**JOHNS ISLAND - SECTION 1135  
ENVIRONMENTAL RESTORATION  
APPENDIX A  
ENGINEERING**

**A. INTRODUCTION**

1. General. The project is located in Lake Worth Lagoon in Palm Beach County, Florida. This Appendix presents a discussion of applicable design considerations and construction methods utilized to establish a basis for the project cost estimates. The proposed restoration plan and location map are provided on Plate A-1.

2. Restoration Plan. The proposed restoration plan would consist of removing exotic vegetation; constructing tidal channels; grading portions of the island to establish wetlands; and re-establishing native vegetation. Details of the proposed plan and the benefits that would be derived are provided in the main report and the Environmental Assessment.

**B. HYDROLOGY AND HYDRAULICS**

3. General. Palm Beach County, as project sponsor, does not plan to do any hydrodynamic modeling for Johns Island. This decision is based on the fact that the design of the restoration plan for Johns Island is very similar to the design used for restoration of nearby Munyon Island which has proven successful.

**C. GEOTECHNICAL INVESTIGATIONS**

4. Subsurface Investigation. Insitu subsurface investigations were undertaken at Johns Island for the purpose of identifying existing materials for excavation and disposal. The borings were located along the alignment of the proposed tidal channels and extend beyond the design bottom elevation of the channels (-4 NGVD)

Borings were performed using an Acker Tripod setup and a 140 pound hammer with a 30 inch drop and a split spoon sampler (1 3/8 " ID, 2" OD). Horizontal locations were measured off a baseline by tape. Elevations were estimated from the existing

survey. Accuracy is estimated at +/- 5 feet horizontal and +/- 1-foot vertical. Boring locations are provided on Plate A-2.

5. Material Encountered. Samples from the island show dredged spoil consisting of fine loose quartz sand with some shell and intermittent boulders or cobbles of limestone, extending to 0 to -4 NGVD. Underlying the mixed spoil is a layer of fine loose quartz sand with some silt and traces of organics. The borings in the northern half of the island did not encounter bedrock. Limestone was encountered at depth in the southern holes and was characterized as porous, hard, sandy limestone with some oyster shells. The limestone is generally below the design depth of the channels and should not interfere with excavation activities.

Laboratory testing was performed on the samples collected, including sieve analysis, moisture content, atterberg limits, organic content, and settling rate. Results are appended to the end of this section. In order to evaluate an in-water disposal alternative, a composite material was mathematically generated using samples retrieved from above the design dredging depth of -4.0 NGVD. The composite material would be classified as sand with a percent of fines at 3.9%. The composite information is shown in Table A-1. Boring logs, grain size distribution curves, and settling rate charts are included in the attachment to this appendix.

#### **D. CONSTRUCTION**

6. General. The proposed restoration plan would involve the removal of exotic vegetation, construction of two tidal channels, creation of wetland habitat, and the planting of mangroves and other native vegetation. It is anticipated that the vegetation cleared from the island would be chipped and used on site, and that the excavated material would be removed and placed in the designated disposal area. The project sponsor provided the cost for placement of the chipped vegetation (mulch) over the estimated 1.4 acres of tropical habitat. All elevations are in feet and tenths and are referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

7. Excavation and Planting. The excavation of the tidal channels, creation of the proposed wetland habitat, and planting would be accomplished in accordance with the environmental restoration plan described in the main report and Environmental Assessment. The wetland habitat and areas to be planted would be graded to an approximate elevation of 1.0 feet (NGVD 29), and the channels would be constructed with a bottom width of 6 feet at an approximate elevation of -4.0 feet (NGVD 29) and side slopes of 1 vertical on 3 horizontal (1V:3H).

8. Channel Revetment. The requirement for providing bank protection to stabilize the mouths of the tidal channels was established by the project sponsor based on their experiences with similar construction on Munyon Island. They also provide the estimated quantity of rock and the cost of construction. Details of the revetment design would be included in the contract plans and specifications.

9. Disposal Area. The northern end of the designated disposal area is located approximately one mile south of the island in the submerged lands (anoxic hole) adjacent to the City of Lake Worth Municipal Golf Course. This area, which extends southward for about 1.2 miles, is designated for restoration under another project (City of Lake Worth Wetland Restoration Project - Section 204) which would benefit by having additional disposal material. The location of the disposal area and general haul route is shown on Plate A-3.

10. Loading Dock. For cost estimating purposes, it is anticipated that a temporary loading dock, approximately 50 feet in length, would be constructed on the West Side of the island. The dock would provide access to deeper water for mooring and loading the disposal barge and off-loading the rock for construction of the tidal channel revetment. The location and design of the dock would be the responsibility of the construction contractor, subject to approval by the contracting officer.

11. Construction Procedure. After clearing and chipping operations are sufficiently complete, excavation of the tidal channels could commence. Construction of the channels should begin at the upland terminus and proceed to the island's edge to minimize tidal intrusion. Portions of the wetland habitat creation and planting could be accomplished concurrently.

## **E. RELOCATIONS**

12. General. The project sponsor would be responsible for providing all the lands easements, rights-of-way, relocations, and disposal (LERRD) as required for construction of the proposed project features.

## **F. OPERATION AND MAINTENANCE**

13. General. The contractor would be responsible for all maintenance during the construction contract. After completion of the construction contract, the project sponsor would assume the responsibility for operating and maintaining the project.

A discussion of the maintenance and monitoring requirements is presented in the Environmental Assessment and the main report.

## **G. QUANTITIES AND COST ESTIMATE**

14. Summary of Costs. The estimates of first cost for construction of the recommended plan were prepared using M-CACES software and are presented in Table A-2. The estimate includes a narrative and summary cost showing quantity, unit cost, and the amount for contingencies for each cost item.

The costs have been prepared for an effective date of November 2000.

TABLE A-1												
JOHNS ISLAND ENVIRONMENTAL RESTORATION												
COMPOSITE GRAIN SIZE (for channel depth -4.0 NGVD)												
CB	SAMPLE NO.	% FINES	% FINER BY SIEVE NUMBER									
			4	10	20	40	60	100	200			
CB-1	2	1.7	37.4	33.0	26.6	12.6	6.6	3.7	1.7			
CB-2	5	2.0	99.5	98.2	96.1	84.4	46.1	11.4	2.0			
CB-3	2	0.9	97.6	94.7	90.9	71.0	25.3	4.3	0.9			
	5	3.2	99.9	99.7	98.0	66.2	19.1	5.6	3.2			
CB-4	2	2.5	91.2	85.8	74.5	40.2	13.5	4.5	2.5			
	4	5.7	100.0	99.6	98.0	66.7	19.6	8.1	5.7			
CB-5	1	4.1	97.7	95.7	90.7	70.8	40.5	14.2	4.1			
	5	4.6	100.0	99.8	98.0	64.2	17.4	6.7	4.6			
CB-6	1	0.9	99.8	98.9	94.0	35.7	5.7	2.0	0.9			
	4	5.4	83.1	77.9	67.1	39.0	16.1	8.4	5.4			
CB-7	2	11.5	97.7	97.0	95.1	75.2	36.4	17.0	11.5			
MEAN		3.9	91.3	89.1	84.5	56.9	22.4	7.8	3.9			

**TABLE A-1**

Fri 03 Nov 2000

Eff. Date 12/01/00

U.S. Army Corps of Engineers

PROJECT JIF001: John's Island - Ecosystem Restoration Report

John's Island Restoration

TIME 11:16:21

TITLE PAGE 1

John's Island  
Ecosystem Restoration Report  
Palm Beach County, Florida

## TABLE A-2

Designed By: Jacksonville District  
Estimated By: M Fascher

Prepared By: Kirby Ray Clifton

Preparation Date: 11/02/00  
Effective Date of Pricing: 12/01/00

Sales Tax: 6.00%

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The original cost estimate has been updated to include the construction and dismanteling of a temporary dock on the west side of the island. The dock is necessary for the loading of spoil onto barges and for the unloading of the stone.

Plan is to ecologically restore a 6.5-acre spoil island by removing and chipping approximately 5 acres of exotic plants, constructing tidal channel system by removing 17,000 cy of material and planting approximately 13,800 red mangroves, 11,400 plugs of cordgrass, and 500 tropical hammock plants. Assume that excavated material will be disposed of offsite approximately 2 miles away with no disposal fees or disposal area costs.

Contingencies of 20% were used based on the level of design.

E&D costs were provided by design engineer and project manager. S&I costs are based on using percentages as directed by the project manager(9%).

	QUANTITY	UOM	CONTRACT	CONTINGEN	ESCALATN	TOTAL COST	UNIT
-----							
01 Johns Island Restoration							
01. A Construction Cost							
01. A-06 Fish and Wildlife Facilities							
01. A-06-03 Wildlife Facilities & Sanctuary							
01. A-06-03_73 Habitat and Feeding Facilities							
01. A-06-03_73_01 Mob and Demob			61,670	12,330	0	74,010	
01. A-06-03_73_02 Complete Clearing	5.00	ACR	8,770	1,750	0	10,530	2105.33
01. A-06-03_73_03 Limestone Boulders	500.00	TNS	21,680	4,340	0	26,010	52.02
01. A-06-03_73_05 Chipping	5.00	ACR	7,390	1,480	0	8,870	1773.74
01. A-06-03_73_06 Excavation/Fill	17000	CY	113,160	22,630	0	135,790	7.99
01. A-06-03_73_08 Temporary Loading Dock			40,050	8,010	0	48,060	
01. A-06-03_73_09 Tropical Hammocks	500.00	EA	69,040	13,810	0	82,850	165.70
01. A-06-03_73_10 Cordgrass	11400	EA	18,630	3,730	0	22,350	1.96
01. A-06-03_73_11 Red Mangrove	13800	EA	34,300	6,860	0	41,150	2.98
TOTAL Habitat and Feeding Facilities			374,680	74,940	0	449,620	
TOTAL Wildlife Facilities & Sanctuary			374,680	74,940	0	449,620	
TOTAL Fish and Wildlife Facilities			374,680	74,940	0	449,620	
TOTAL Construction Cost			374,680	74,940	0	449,620	
-----							
01. B Non-Construction Cost							
01. B-01 Lands and Damages							
01. B-01-01 Lands and Damages			10,000	2,000	0	12,000	
TOTAL Lands and Damages			10,000	2,000	0	12,000	
-----							
01. B-30 Preconstruction, Engr & Design							
01. B-30- 2 Plans and Specifications			148,000	29,600	0	177,600	
TOTAL Preconstruction, Engr & Design			148,000	29,600	0	177,600	
-----							
01. B-31 Construction Management (S&I)							
01. B-31-01 Construction Management (S&I)			43,720	8,740	0	52,460	
-----							

Fri 03 Nov 2000  
Eff. Date 12/01/00

U.S. Army Corps of Engineers  
PROJECT JIF001: John's Island - Ecosystem Restoration Report  
John's Island Restoration  
\*\* PROJECT OWNER SUMMARY - Sub Ele (Rounded to 10's) \*\*

TIME 11:16:21  
SUMMARY PAGE 3

	QUANTY UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
TOTAL Construction Management (S&I)		43,720	8,740	0	52,460	
TOTAL Non-Construction Cost		201,720	40,340	0	242,060	
TOTAL Johns Island Restoration		576,400	115,280	0	691,680	
TOTAL John's Island		576,400	115,280	0	691,680	

Fri 03 Nov 2000

U.S. Army Corps of Engineers

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Eff. Date 12/01/00

PROJECT JIF001: John's Island - Ecosystem Restoration Report

ERROR REPORT

John's Island Restoration

ERROR PAGE 1

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No errors detected...

\* \* \* END OF ERROR REPORT \* \* \*

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Eff. Date 12/01/00  
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PROJECT JIF001: John's Island - Ecosystem Restoration Report  
John's Island Restoration

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SUMMARY REPORTS

SUMMARY PAGE

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PROJECT OWNER SUMMARY - Sub Ele.....	2

No Detailed Estimate...

No Backup Reports...

\* \* \* END TABLE OF CONTENTS \* \* \*

Fri 03 Nov 2000  
Eff. Date 12/01/00

U.S. Army Corps of Engineers  
PROJECT JIF001: John's Island - Ecosystem Restoration Report  
John's Island Restoration  
\*\* PROJECT OWNER SUMMARY - Culvert (Rounded to 10's) \*\*

TIME 11:16:21

SUMMARY PAGE 1

	QUANTY UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
01 Johns Island Restoration		576,400	115,280	0	691,680	
TOTAL John's Island		576,400	115,280	0	691,680	

## **ATTACHMENT**

**Core Boring Logs, Grain Size Distribution Curves,  
and Settling Rate Reports**

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 1	
1. PROJECT West Palm Beach - Johns Island				10. SIZE AND TYPE OF BIT See Remarks			
2. LOCATION (Coordinates or Station) X=969,156 Y=842,404				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD-29 Horizontal Datum: FLE NAD-83			
3. DRILLING AGENCY Corps Of Engineers				12. MANUFACTURER'S DESIGNATION OF DRILL Acker Tri-pod			
4. HOLE NO. (As shown on drawing title and file number) CB-J100-1				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN disturbed: 6 undisturbed: 0			
5. NAME OF DRILLER L.C. Gregory				14. TOTAL NUMBER OF CORE BOXES 1 (Box 1)			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				15. ELEVATION GROUND WATER +0.3			
7. THICKNESS OF BURDEN Ft.				16. DATE HOLE STARTED COMPLETED 24 Jul 00 24 Jul 00			
8. DEPTH DRILLED INTO ROCK 0.0 Ft.				17. ELEVATION TOP OF HOLE +3.8 Ft.			
9. TOTAL DEPTH OF HOLE 10.5 Ft.				18. TOTAL CORE RECOVERY FOR BORING 54 %			
				19. SIGNATURE OF GEOLOGIST C. Papiernik			
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/ 5'
3.8	0					3.8	0
			SAND, fine quartz, loose, damp, tan, trace fine shells, trace sandy limestone gravel, fine, top 2" organic, many lenses of limestone. SP	53	1	SPLIT SPOON	1
						2.3	2
							4
							6
				67	2 D-2	SPLIT SPOON	24
						.8	17
			(Fill Material)				12
				80	3	SPLIT SPOON	14
						-.7	17
							4
				33	4	SPLIT SPOON	9
-2.2	6.0					-2.2	5
-2.7	6.5		from 6.0' to 6.5' very peaty				1
			SAND, fine quartz, loose, saturated, dark brown, some organics, trace silt. SP	80	5 D-5	SPLIT SPOON	1
						-3.7	3
							2
				0	0	SPLIT SPOON	3
-5.2	9.0					-5.2	5
			Silty SAND, fine quartz, loose, saturated, brown, trace silt, trace clay. SM	67	6 D-6	SPLIT SPOON	3
-6.7	10.5					-6.7	3
			Soils are field visually classified in accordance with the Unified Soils Classification System.			140# HAMMER WITH 30" DROP USED ON 2" SPLIT SPOON (1 3/8" ID X 2" OD) HORIZ POSITION EST BY TAPE ACCURACY +/- 5 FEET	12.5
							15
							17.5
							20
							22.5

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 1	
1. PROJECT West Palm Beach - Johns Island				10. SIZE AND TYPE OF BIT See Remarks			
2. LOCATION (Coordinates or Station) X=969,331 Y=842,316				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD-29 Horizontal Datum: FLE NAD-83			
3. DRILLING AGENCY Corps Of Engineers				12. MANUFACTURER'S DESIGNATION OF DRILL Acker Tri-pod			
4. HOLE NO. (As shown on drawing title and file number) CB-JI00-2				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN disturbed: 7 undisturbed: 0			
5. NAME OF DRILLER L.C. Gregory				14. TOTAL NUMBER OF CORE BOXES 1 (Box 1)			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				15. ELEVATION GROUND WATER Not Observed			
7. THICKNESS OF BURDEN Ft.				16. DATE HOLE STARTED COMPLETED 25 Jul 00 25 Jul 00			
8. DEPTH DRILLED INTO ROCK 0.0 Ft.				17. ELEVATION TOP OF HOLE 4.5 Ft.			
9. TOTAL DEPTH OF HOLE 10.5 Ft.				18. TOTAL CORE RECOVERY FOR BORING 77 %			
				19. SIGNATURE OF GEOLOGIST C. Papiernik			
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/ ft.
4.5	0		SAND, fine quartz, loose, moist, tan, upper 3" organic, trace fine shells, trace medium sand. SP	87	1	4.5	0
			(Fill Material)	67	2	3.0	1
					D-2	SPLIT SPOON	2
						1.5	3
							5
			saturated, light gray	53	3	SPLIT SPOON	2
						.0	3
							6
				67	4	SPLIT SPOON	2
						-1.5	4
							3
				100	5	SPLIT SPOON	1
					D-5		2
						-3.0	2
							7.5
				67	6	SPLIT SPOON	1
-4.0	8.5		SAND-Silty SAND, fine quartz, loose, dark brown, trace silt, trace organics. SP-SM			-4.5	1
				100	7	SPLIT SPOON	2
					D-7		3
-6.0	10.5					-6.0	2
			Soils are field visually classified in accordance with the Unified Soils Classification System.			140# HAMMER WITH 30" DROP USED ON 2" SPLIT SPOON (1 3/8" ID X 2" OD)	
						HORIZ POSITION EST BY TAPE ACCURACY +/- 5 FEET	12.5
							15
							17.5
							20
							22.5

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC #	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/ 5'
5.0	.0					5.0	0
			SAND, fine quartz, loose, damp, tan, occasional limestone boulders and cobbles, trace organic, trace fine shells. SP	67	1	SPLIT SPOON	1
						3.5	2
			(Fill Material)	80	2 D-2	SPLIT SPOON	3
						2.0	4
							7
				100	3	SPLIT SPOON	4
						.5	4
							1
-3.3	5.3		from 5.3' to 5.5' peat layer	73	4	SPLIT SPOON	1
			SAND-Silty SAND, fine quartz, loose, saturated, brown, trace fine shells, trace silt, trace organics. SP-SM			-1.0	1
				100	5 D-5	SPLIT SPOON	2
						-2.5	4
							5
				80	6	SPLIT SPOON	1
						-4.0	1
							3
				100	7 D-7	SPLIT SPOON	5
						-5.5	7
-5.5	10.5		Soils are field visually classified in accordance with the Unified Soils Classification System.			140# HAMMER WITH 30" DROP USED ON 2" SPLIT SPOON (1 3/8" ID X 2" OD)	
						HORIZ POSITION EST BY TAPE ACCURACY +/- 5 FEET	
							12.5
							15
							17.5
							20
							22.5

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 1	
1. PROJECT West Palm Beach - Johns Island				10. SIZE AND TYPE OF BIT See Remarks			
2. LOCATION (Coordinates or Station) X=969,165 Y=841,725				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD-29 Horizontal Datum: FLE NAD-83			
3. DRILLING AGENCY Corps Of Engineers				12. MANUFACTURER'S DESIGNATION OF DRILL Acker Tri-pod			
4. HOLE NO. (As shown on drawing title and file number) CB-J100-4				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN disturbed: 6 undisturbed: 0			
5. NAME OF DRILLER L.C. Gregory				14. TOTAL NUMBER OF CORE BOXES 1 (Box 1)			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				15. ELEVATION GROUND WATER 1.3			
7. THICKNESS OF BURDEN Ft.				16. DATE HOLE STARTED COMPLETED 27 Jul 00 27 Jul 00			
8. DEPTH DRILLED INTO ROCK 0.0 Ft.				17. ELEVATION TOP OF HOLE 3.3 Ft.			
9. TOTAL DEPTH OF HOLE 8.7 Ft.				18. TOTAL CORE RECOVERY FOR BORING 71 %			
				19. SIGNATURE OF GEOLOGIST C. Papiernik			
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/ 5'
3.3	0					3.3	0
			SAND, fine quartz, loose, moist, tan, trace fine shells, occasional limestone cobbles and boulders. SP	73	1	SPLIT SPOON	2
			(Fill Material)			1.8	3
				67	2	SPLIT SPOON	4
					D-2		4
						.3	6
			from 3.5' becoming light gray	67	3	SPLIT SPOON	3
						-1.2	4
							5
-1.3	4.6		SAND-Silty SAND, organic, fine quartz, loose, saturated, dark brown, trace silt, little organics. SP-SM	67	4	SPLIT SPOON	1
						-2.7	0
							1
			more silt with depth	87	5	SPLIT SPOON	7
						-4.2	2
			LIMESTONE, hard, porous, sandy, oyster bed.				20
				68	6	SPLIT SPOON	37
					D-6		50
-5.4	8.7					-5.4	48
			Soils are field visually classified in accordance with the Unified Soils Classification System.			140# HAMMER WITH 30" DROP USED ON 2" SPLIT SPOON (1 3/8" ID X 2" OD)	10
						HORIZ POSITION EST BY TAPE ACCURACY +/- 5 FEET	12.5
							15
							17.5
							20
							22.5

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 1	
1. PROJECT West Palm Beach - Johns Island				10. SIZE AND TYPE OF BIT See Remarks			
2. LOCATION (Coordinates or Station) X=969,175 Y=841,535				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD-29 Horizontal Datum: FLE NAD-83			
3. DRILLING AGENCY Corps Of Engineers				12. MANUFACTURER'S DESIGNATION OF DRILL Acker Tri-pod			
4. HOLE NO. (As shown on drawing title and file number) CB-JI00-5				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN disturbed: 7 undisturbed: 0			
5. NAME OF DRILLER L.C. Gregory				14. TOTAL NUMBER OF CORE BOXES 1 (Box 2)			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				15. ELEVATION GROUND WATER 1.8			
7. THICKNESS OF BURDEN Ft.				16. DATE HOLE STARTED COMPLETED 27 Jul 00 27 Jul 00			
8. DEPTH DRILLED INTO ROCK 0.0 Ft.				17. ELEVATION TOP OF HOLE 3.8 Ft.			
9. TOTAL DEPTH OF HOLE 9.7 Ft.				18. TOTAL CORE RECOVERY FOR BORING 57 %			
				19. SIGNATURE OF GEOLOGIST C. Papiernik			
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/ 5'
3.8	.0					3.8	
			SAND, fine quartz, loose, moist, tan, trace shells, occasional limestone cobbles and boulders. SP	80	1 D-1	SPLIT SPOON	1
						2.3	3
							5
			(Fill Material)	67	2	SPLIT SPOON	8
						.8	9
							12
				27	3	SPLIT SPOON	10
						-.7	9
-1.2	5.0						3
			SAND-Silty SAND, fine quartz, loose, saturated, dark brown, trace silt, trace organics. SP-SM	47	4	SPLIT SPOON	1
						-2.2	1
				60	5 D-5	SPLIT SPOON	2
						-3.7	2
			more silty with clay @ 8.0'	67	6	SPLIT SPOON	1
-4.6	8.4		LIMESTONE, hard, porous, gray.			-5.2	3
				100	7	SPLIT SPOON	6
-5.9	9.7					-5.9	30
							50
			Soils are field visually classified in accordance with the Unified Soils Classification System.			Boring advanced with 6" Auger. 140# HAMMER WITH 30" DROP USED ON 2" SPLIT SPOON (1 3/8" ID X 2" OD)	
						HORIZ POSITION EST BY TAPE ACCURACY +/- 5 FEET	

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 1	
1. PROJECT West Palm Beach - Johns Island				10. SIZE AND TYPE OF BIT See Remarks			
2. LOCATION (Coordinates or Station) X=969,264 Y=842,595				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD-29 Horizontal Datum: FLE NAD-83			
3. DRILLING AGENCY Corps Of Engineers				12. MANUFACTURER'S DESIGNATION OF DRILL Acker Tri-pod			
4. HOLE NO. (As shown on drawing title and file number) CB-JI00-6				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN disturbed: 8 undisturbed: 0			
5. NAME OF DRILLER L.C. Gregory				14. TOTAL NUMBER OF CORE BOXES 1 (Box 1)			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				15. ELEVATION GROUND WATER 1.5			
7. THICKNESS OF BURDEN Ft.				16. DATE HOLE STARTED COMPLETED 25 Jul 00 25 Jul 00			
8. DEPTH DRILLED INTO ROCK 0.0 Ft.				17. ELEVATION TOP OF HOLE 4.0 Ft.			
9. TOTAL DEPTH OF HOLE 10.5 Ft.				18. TOTAL CORE RECOVERY FOR BORING 69 %			
				19. SIGNATURE OF GEOLOGIST C. Papiernik			
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/ 5'
4.0	0					4.0	0
			SAND, fine quartz, loose, damp, tan, trace fine shells, trace organics, occasional limestone cobbles and boulders. SP	67	1 D-1	SPLIT SPOON	1
						2.5	1
				47	2	SPLIT SPOON	4
						1.0	6
			saturated, light gray, occasional limestone gravel	47	3	SPLIT SPOON	7
						-0.5	8
				47	4 D-4	SPLIT SPOON	6
			(Fill Material)			-2.0	3
				100	5	SPLIT SPOON	3
-3.3	7.3					-3.5	2
			SAND-Silty SAND, fine quartz, loose, saturated, dark brown, little organics, trace silt. SP-SM	73	6 D-6	SPLIT SPOON	1
						-5.0	3
-6.0	10.0			100	7	SPLIT SPOON	4
-6.5	10.5		Silty SAND, loose, saturated, dark brown, trace clay, little organics. SM		8		3
						-6.5	5
			Soils are field visually classified in accordance with the Unified Soils Classification System.			140# HAMMER WITH 30" DROP USED ON 2" SPLIT SPOON (1 3/8" ID X 2" OD)	
						HORIZ POSITION EST BY TAPE ACCURACY +/- 5 FEET	
							12.5
							15
							17.5
							20
							22.5

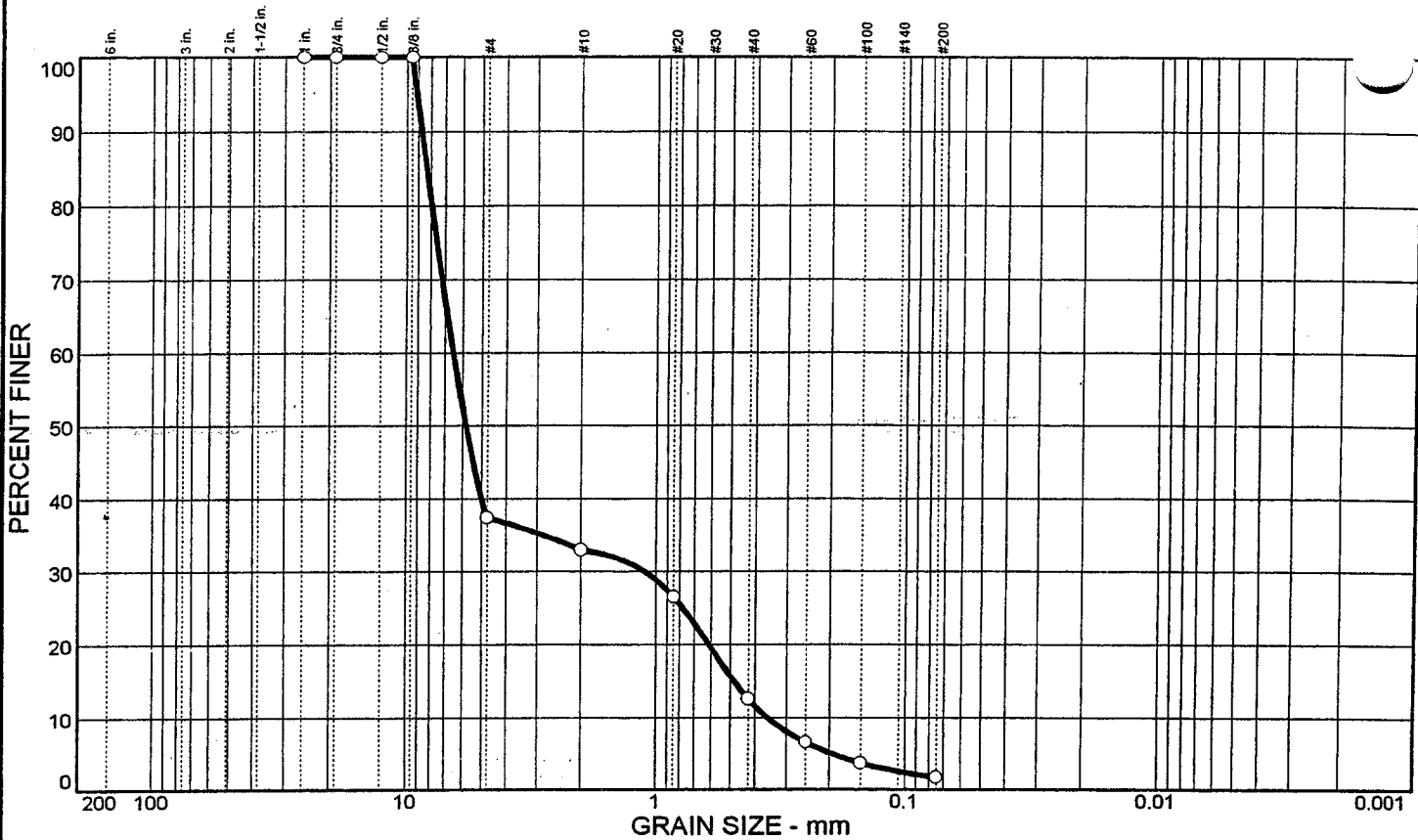
DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 1	
1. PROJECT West Palm Beach - Johns Island				10. SIZE AND TYPE OF BIT See Remarks			
2. LOCATION (Coordinates or Station) X=969,250 Y=841,775				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD-29 Horizontal Datum: FLE NAD-83			
3. DRILLING AGENCY Corps Of Engineers				12. MANUFACTURER'S DESIGNATION OF DRILL Acker Tri-pod			
4. HOLE NO. (As shown on drawing title and file number) CB-JI00-7				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN disturbed: 10 undisturbed: 0			
5. NAME OF DRILLER L.C. Gregory				14. TOTAL NUMBER OF CORE BOXES 1 (Box 2)			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				15. ELEVATION GROUND WATER 1.5			
7. THICKNESS OF BURDEN Ft.				16. DATE HOLE STARTED COMPLETED 27 Jul 00 27 Jul 00			
8. DEPTH DRILLED INTO ROCK 0.0 Ft.				17. ELEVATION TOP OF HOLE 2.0 Ft.			
9. TOTAL DEPTH OF HOLE 10.5 Ft.				18. TOTAL CORE RECOVERY FOR BORING 72 %			
				19. SIGNATURE OF GEOLOGIST C. Papiernik			
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/ 5'
2.0	.0					2.0	0
			SAND, fine quartz, loose saturated, dark brown, some organics, little fine shells, limestone gravel, occasional cobbles. SP	33	1	SPLIT SPOON	1
			(Fill Material)	80	3	SPLIT SPOON	4
				87	4 D-4	SPLIT SPOON	2
-3.0	5.0		SAND-Silty SAND, fine quartz, loose, saturated, brown, trace silt, trace organics. SP-SM	67	5	SPLIT SPOON	1
				67	6	SPLIT SPOON	3
				67	7 D-7	SPLIT SPOON	6
				80	8	SPLIT SPOON	2
-7.5	9.5		LIMESTONE, hard, gray, oyster bed.	93	9	SPLIT SPOON	7
-8.5	10.5				10	SPLIT SPOON	22
			Soils are field visually classified in accordance with the Unified Soils Classification System.			140# HAMMER WITH 30" DROP USED ON 2" SPLIT SPOON (1 3/8" ID X 2" OD)	
						HORIZ POSITION EST BY TAPE ACCURACY +/- 5 FEET	

# SUMMARY OF LABORATORY TEST RESULTS

Johns Island Environmental Restoration Project  
U. S. Army Corps of Engineers  
LAW Project No. 50160-8-0025

Boring No.	Sample No.	Depth (Feet)	Unified Soil Classification Symbol	Moisture Content (%)	Percent Fines (%)	Atterberg Limits			Organic Content (%)
						Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	
CBJI00-1	2	1.5 - 2.5	GP		1.7				
CBJI00-1	5	6.0 - 7.2		225.5					
CBJI00-1	6	9.0 - 10.0		32.3					5.7
CBJI00-2	5	6.0 - 7.5	SP	24.8	2.0	NP	NP	NP	
CBJI00-2	7	9.0 - 10.5	SP		3.7				
CBJI00-3	2	1.5 - 2.7	SP		0.9				
CBJI00-3	5	6.0 - 7.5	SP	31.0	3.2	NP	NP	NP	
CBJI00-3	7	9.0 - 10.5		0.4					0.8
CBJI00-4	2	1.5 - 2.5	SP		2.5				
CBJI00-4	4	4.5 - 5.5	SP-SM		5.7	NP	NP	NP	
CBJI00-5	1	0.0 - 1.2	SP		4.1				
CBJI00-5	5	6.0 - 6.9	SP		4.6	NP	NP	NP	
CBJI00-6	1	0.0 - 1.0	SP		0.9				
CBJI00-6	4	4.5 - 5.2	SP-SC	20.0	5.4				
CBJI00-6	6	7.5 - 8.6	SP		3.3	NP	NP	NP	
CBJI00-7	2	1.5 - 2.0	SP-SM		11.5				
CBJI00-7	4	3.0 - 4.3		24.9					
CBJI00-7	7	6.0 - 7.0	SP		2.4				0.6

# Grain Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL
0	62.6	35.7	1.7		GP	A-1-a	

SIEVE inches size	PERCENT FINER		
1	100.0		
3/4	100.0		
1/2	100.0		
3/8	100.0		
GRAIN SIZE			
D60	6.49		
D30	1.11		
D10	0.356		
COEFFICIENTS			
C <sub>c</sub>	0.53		
C <sub>u</sub>	18.21		

SIEVE number size	PERCENT FINER		
#4	37.4		
#10	33.0		
#20	26.6		
#40	12.6		
#60	6.6		
#100	3.7		
#200	1.7		

**SOIL DESCRIPTION**  
 ○ GRAVEL, fine to coarse gravel sized fragments, some fine to medium quartz sand, tan

**REMARKS:**  
 ○

○ Source: CB-JI00-1

Sample No.: 2

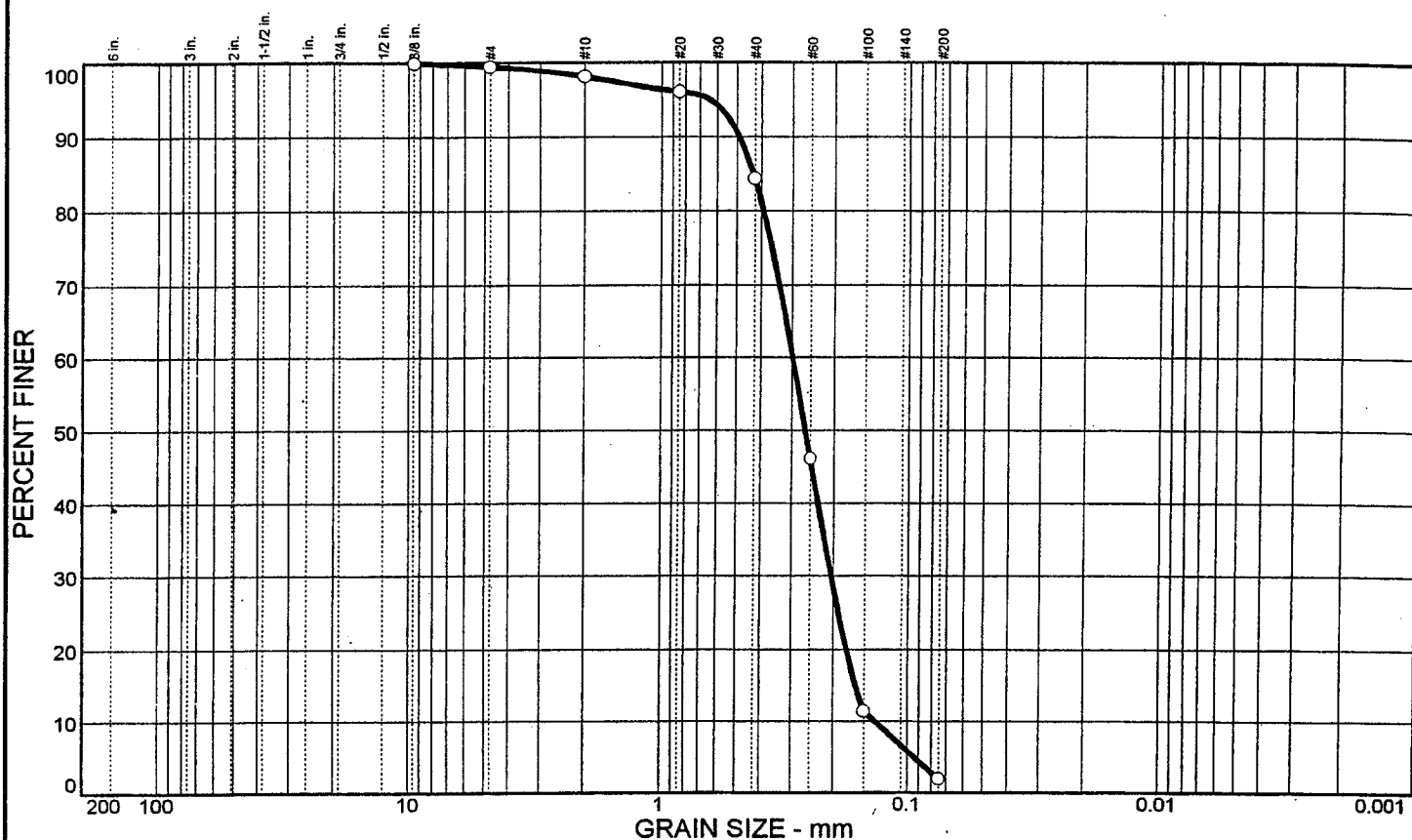
Elev./Depth: 1.5'-2.5'

**Law Engineering and  
Environmental Services, Inc.**

Client: US Army Corp of Engineers  
 Project: Johns Island at West Palm Beach

Project No.: 50160-8-0025-JO11

# Grain Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
0	0.5	97.5	2.0		SP	A-3		

SIEVE inches size	PERCENT FINER		
	○		
.375	100.0		
<hr/>			
GRAIN SIZE			
D <sub>60</sub>	0.296		
D <sub>30</sub>	0.204		
D <sub>10</sub>	0.135		
<hr/>			
COEFFICIENTS			
C <sub>c</sub>	1.04		
C <sub>u</sub>	2.19		

SIEVE number size	PERCENT FINER		
	○		
#4	99.5		
#10	98.2		
#20	96.1		
#40	84.4		
#60	46.1		
#100	11.4		
#200	2.0		

SOIL DESCRIPTION
○ SAND, fine quartz, trace sand sized shell fragments, brown

REMARKS:
○

○ Source: CB-JI00-2

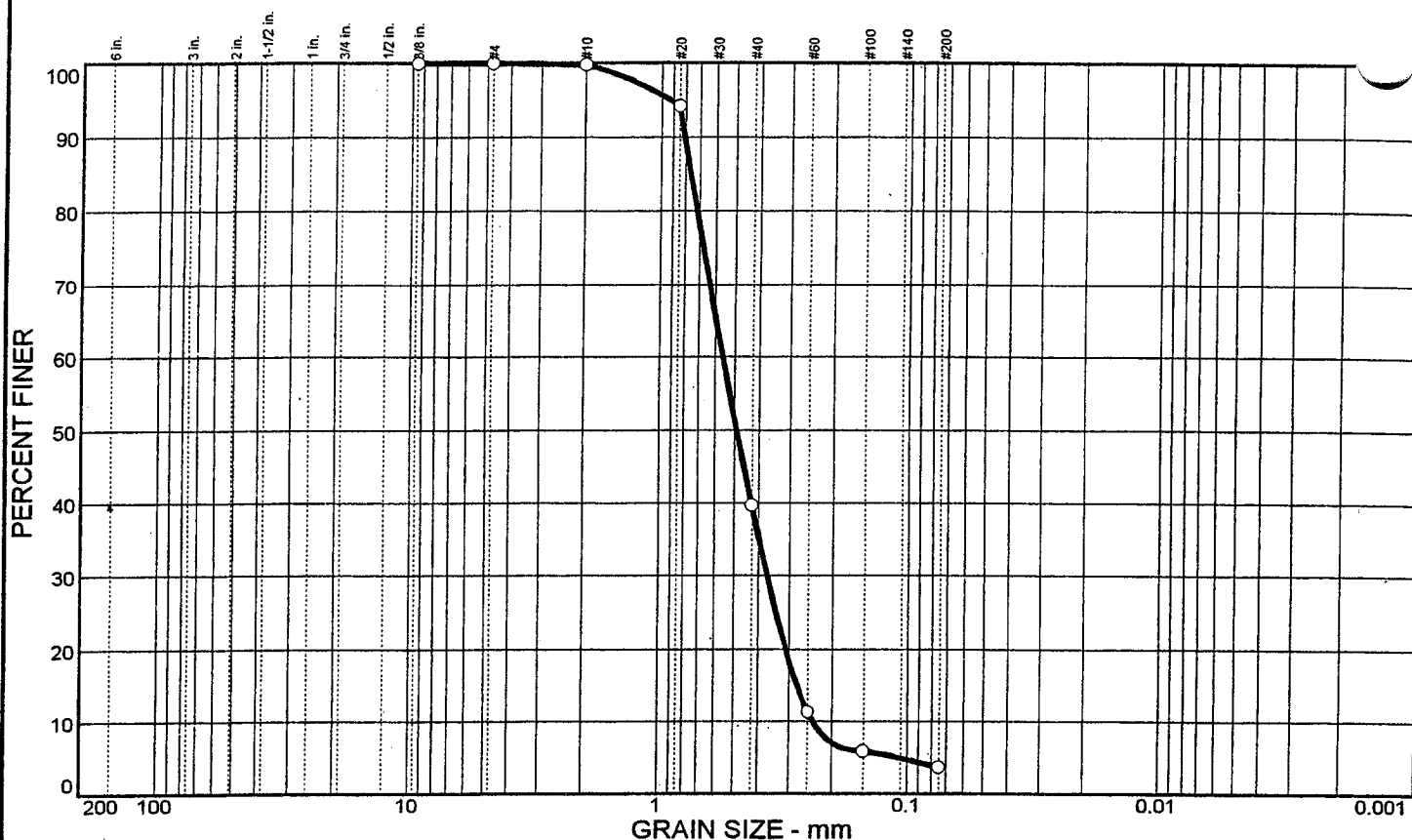
Sample No.: 5

Elev./Depth: 6.0'-7.5'

**Law Engineering and  
Environmental Services, Inc.**

Client: US Army Corp of Engineers  
Project: Johns Island at West Palm Beach  
Project No.: 50160-8-0025-JO11

# Grain Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
0		96.3	3.7		SP	A-1-b		

SIEVE inches size	PERCENT FINER		
	○		
.375	100.0		
GRAIN SIZE			
D <sub>60</sub>	0.557		
D <sub>30</sub>	0.368		
D <sub>10</sub>	0.238		
COEFFICIENTS			
C <sub>c</sub>	1.02		
C <sub>u</sub>	2.34		

SIEVE number size	PERCENT FINER		
	○		
#4	100.0		
#10	99.8		
#20	94.2		
#40	39.7		
#60	11.3		
#100	5.9		
#200	3.7		

**SOIL DESCRIPTION**  
 ○ SAND, fine quartz, trace sand sized shell fragments, brown

**REMARKS:**  
 ○

○ Source: CB-JI00-2

Sample No.: 7

Elev./Depth: 9.0'-10.5'

**Law Engineering and  
Environmental Services, Inc.**

Client: US Army Corp of Engineers  
 Project: Johns Island at West Palm Beach  
 Project No.: 50160-8-0025-JO11